X_1, X_2, X_m, $X_{(m+1)}$, $X_{(2m-1)}$, and X_{2m} are carboxamide residues forming carboxamide binding pairs X_1/X_{2m}, $X_2/X_{(2M-1}$, $X_M/X_{M+1)}$,

γ is γ-aminobutyric acid or 2,4 diaminobutyric acid, and

R_1 is $-NH(CH_2)_{0\text{-}100}NR_2R_3$, $-NH(CH_2)_{0\text{-}100}CO\ NH(CH_2)_{0\text{-}100}NR_2R_3$, or $-NHR_2$, where R_2 and R_3 are independently selected from the group consisting of H, Cl, NO, N-acetyl, benzyl, $C_{1\text{-}100}$ alkyl, $C_{1\text{-}100}$ alkylamine, $C_{1\text{-}100}$ alkyldiamine, $C_{1\text{-}100}$ alkylcarboxylate, $C_{1\text{-}100}$ alkenyl, a $C_{1\text{-}100}$ alkynyl, and $C_{1\text{-}100}$ alkyl-L, where L is selected from the group consisting of arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens, solid phase supports, oligodeoxynucleotides, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, and oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, taartaric acid, and (+)-α-tocopheral, suitable for use as a DNA-binding ligand that is selective for identified target DNA-sequences 5'-$WN_1N_2 \ldots N_mW$-3' where m is an integer having a value from 3 to 6, the method comprising:

(a) identifying a target sequence of double stranded DNA having the form 5'-$WN_1N_2 \ldots N_mW$-3', $N_1N_2 \ldots N_m$ being the sequence to be bound by carboxamide residues, wherein each N is independently chosen from the group A, G, C, and T, each W is independently chosen from the group A and T, and m is an integer having a value from 3 to 6;

(b) representing the identified sequence as 5'-W*ab* ... *x*W-3', wherein *a* is a first nucleotide to be bound by the X_1 carboxamide residue, *b* is a second nucleotide to be bound by the X_2 carboxamide residue, and *x* is the corresponding nucleotide to be bound by the X_m carboxamide residue;

(c) defining *a* as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified sequence;

(d) selecting Im as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if a = G;

(e) selecting Py as the X_1 carboxamide residue and Im as the X_{2m} carboxamide residue if *a* = C;

(f) selecting Hp as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if *a* = T;

(g) selecting Py as the X_1 carboxamide residue and Hp as the X_{2m} carboxamide residue if *a* = A; and

(h) repeating steps c – g for *b* through *x* until all carboxamide residues are selected;

wherein Im is N-methylimidazole, Hp is , Py is N-methylpyrrole, A is adenine, G is guanine, C is cytosine, and T is thymine.

2. (Amended) The method of claim 1 further comprising the step of synthesizing the polyamide.

3. (Amended) The method of claim 2 further comprising the step of determining if the binding affinity of the polyamide to the identified target sequence is subnanomolar.

4. (Amended) The method of claim 1 further comprising the step of determining if the polyamide exhibits a binding affinity that is at leas ten-fold higher for said identified target sequence compared to a non-target DNA sequence.

38. (Amended) A polyamide composition produced by the method of claim 2 wherein one carboxamide binding pair is β/β, wherein β is β-alanine.

42. (Amended) The method of claim 1 wherein the identified target DNA sequence is a regulatory sequence.

43. (Amended) The method of claim 1 wherein the identified target DNA sequence is a promoter sequence.

44. (Amended) The method of claim 1 wherein the identified target DNA sequence is a coding sequence.

D3

45. (Amended) The method of claim 1 wherein the identified target DNA sequence is a non-coding sequence.

46. (Amended) A polyamide composition produced by the method of claim 2 wherein the binding of the carboxamide binding pairs to the identified target DNA sequence modulates the expression of a gene.

47. (Amended) A composition comprising an effective amount of a polyamide produced by the method of claim 2 and a pharmologically suitable excipient.

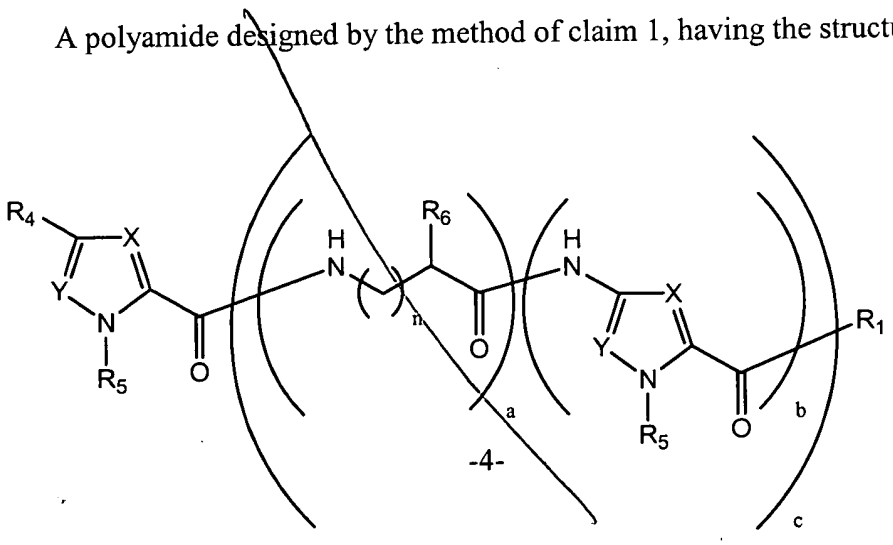
48. (Amended) A diagnostic kit comprising a polyamide produced by the method of claim 2.

Please enter the following new claim:

49. (New) A polyamide designed by the method of claim 1, having the structure:

D4

Sub F2



wherein

R_4 is selected from the group consisting of H, NH_2, SH, Cl, Br, F, N-acetyl, and N-formyl;

each R_5 is independently selected from the group consisting of H, $(CH_2)_{0-6}CH_3$, $(CH_2)_{0-6}NH_2$, $(CH_2)_{0-6}SH$, $(CH_2)_{0-6}OH$, $(CH_2)_{0-6}N(R_7)_2$, $(CH_2)_{0-6}OR_7$, and $(CH_2)_{0-6}SR_7$, wherein R_7 is $(CH_2)_{0-6}CH_3$, $(CH_2)_{0-6}NH_2$, $(CH_2)_{0-6}SH$, or $(CH_2)_{0-6}OH$;

each R_6 is independently selected from the group consisting of H, NH_2, OH, SH, Br, Cl, F, OMe, CH_2OH, CH_2SH, and CH_2NH_2;

R_1 is $-NH(CH_2)_{0-100}NR_2R_3$, $-NH(CH_2)_{0-100}CO\ NH(CH_2)_{0-100}NR_2R_3$, or $-NHR_2$, where R_2 and R_3 are independently selected from the group consisting of H, Cl, NO, N-acetyl, benzyl, C_{1-100} alkyl, C_{1-100} alkylamine, C_{1-100} alkyldiamine, C_{1-100} alkylcarboxylate, C_{1-100} alkenyl, a C_{1-100} alkynyl, and C_{1-100} alkyl-L, where L is selected from the group consisting of arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens, solid phase supports, oligodeoxynucleotides, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, and oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, taartaric acid, and (+)-α-tocopheral;

each X and Y are independently selected from the group consisting of N, CH, COH, CCH_3, CNH_2, CCl, and CF;

each n is an integer from 1 to 2;

each a is an integer from 0 or 1;